Math 361 **Numerical Analysis**
11/14/19 Quiz 9

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Name

Answer the following questions in the space provided. (30 pts. total.)

Consider the derivative formulation below:

$$f'(x_0) = N_1(h) + k_1 h + k_2 h^2 + k_3 h^3 + \cdots, \qquad N_1(h) = \frac{1}{h}[f(x_0 + h) - f(x_0)]$$

Fill in the entries numbered (1) – (6) in the table below using Richardson extrapolation to find the associated estimates for $f'(x_0)$, given that $f(x) = \sin(x), h = 0.2,\ x_0 = 4$. You need only enter your answers in the table below and are not required to show your work. However, partial credit may be given for incorrect answers if appropriate supporting work is shown. (5 pts. each)

	h	O(h)	$O(h^2)$	$O(h^3)$
h =	0.2	(1) −0.57387		
h/2 =	0.1	(2) −0.61475	(4) −0.65563	
h/4 =	0.05	(3) −0.63446	(5) −0.65417	(6) −0.65368